

fracture his skull. He, however, did not lose for an instant his consciousness, but informed those surrounding him, that he was about to meet Dr. I. Hayes Agnew in consultation at the residence of a patient and to send there for him at once. By the most skillful treatment, aided by his wonderful physical vigor, he apparently recovered entirely. This was in August, 1879, and almost to the hour of his death, on December 20, 1888, he pursued his usual vocation. During the last year of his life, he underwent great sufferings, from which the skill of his physicians was unable to relieve him. How far the frightful shock to his system had sapped his vitality and caused this trouble, it is perhaps impossible accurately to determine. He was entirely conscious that his life hung by a thread and realized as a physician that his case was hopeless. He died, however, like a soldier at his post, with the most serene courage and self-possession.

His first wife having died in 1848, Dr. Wister was happily married a second time on June 26, 1854, to Miss Annie Lee Furness, who survives him, as well as his daughter by his first wife, Mrs. Clifford B. Rossell.

An Outline of the Philosophy of Evolution.

By E. D. Cope.

(Read before the American Philosophical Society, October 4, 1889.)

Mental processes are divided into those of presentation and those of representation, or those of perception and those of ideation. A vast difference distinguishes the physiological action of these two forms of mentality. Sensuous perception is a more distinct, sometimes even a violent state of consciousness, while ideation is a much less distinct condition, although the range of its degrees of impressiveness in consciousness is very great. In a conflict between perception and ideation for the control of consciousness, the former can nearly always win, temporarily at least, in the healthy organism. But the impressiveness of perception is perhaps the cause of its remarkable transitory character. It is a fact of great importance that sensations cannot be exactly reproduced in memory, while ideas can be so reproduced. Sensations leave residua, it is true, which are the materials of ideation, but it is only ideas which memory preserves in their original form. It has been suggested * that this result is due to a destruction of tissue caused by the greater energy of sensations; while ideation, less violent, is principally constructive, organizing brain molecules into

* American Naturalist, 1886, p. 83.

relations of position which faithfully reproduce the primitive form of consciousness when consciousness recurs in them. This fact indicates that ideation is a constructive agent, a proposition which receives support from the history of animal evolution in general. It must be remarked, however, that the forms of ideation differ much in their constructive power. Emotional ideation is far less constructive than the intellectual, and of the intellectual faculties, the rational is the most persistent.

Ideation, in the wide sense, falls into the three classes indicated by Kant, those of the intellect, the emotions and the will. In the process of evolution of animals the faculties of each of these classes have played an active part in adapting the individual to the environment; in changing its environment; and in directing the movements of its organs; thus affecting its structure through use and disuse. As the primitive motive in all action, we may assign the emotions in their various forms, as the appetites, the tastes, and the affections; the emotions proper constituting the extreme expression of the class. The manner in which these execute their behests and indeed the decision as to whether they shall find executive expression or not, is determined by the intelligence. The act of execution is the will. On a purely physiological explanation of the relation between stimulus and consequent act, the word will is superfluous. But if there be any purely mental process involved which cannot be explained on dynamical principles, then the term will has an important significance. The mental activities then which have so influenced the process of animal evolution (and perhaps other evolution) fall under the two heads of motive and executive faculties, and the motives to action are either emotional or intelligent; or, as is usually the case, of the two in mutual interaction.

At this point we at once reach the ancient question of realism and idealism. We are confronted with the crux of human thought, whether there be any forms of ideation which are not representative; and also whether the forms of ideation determine the properties of matter, or whether they are themselves determined by the properties of matter; and therefore whether the presentative forms, or the sensations, reveal to us a real universe not of our own making, or not. The answer to these questions constitutes our knowledge of the relations of mind to matter. On these depend the most stupendous events. These are nothing less than the persistence or extinction of mind, both that of finite beings like ourselves, but also the extinction of all mind. If mind have no sufficient control over matter, then the dissipation of energy, which inheres in the processes of matter, must end in the extinction of mind. If on the contrary, mind has a sufficient control over matter, then we must view it as a constructive principle at work, to which the integration of matter and dissipation of energy are but secondary or complementary.

Hitherto the nature of cognition has been chiefly considered in the realist-idealist discussion, but the nature of will is equally involved in it. Free will is in some sense *a priori* will or unconditioned will. I propose

to devote a few pages to this old question, both as to the intellect and the will. My apology for doing so is that our knowledge of evolution is now greater than has been the case hitherto ; and also because it appears to me that the attempt to develop a metaphysical system on a basis of Darwinian evolution has been only partially successful. Let us see what results follow the introduction into philosophy of the Lamarckian principle of evolution.

I. THE INTELLECT.

Given perception (presentation) and memory (representation), and we have the materials for the unassisted evolution of *human* intelligence in both its departments of the imagination and the reason. That such development has resulted under the conditions imposed by the environment can be doubted by no one who has studied animals. Such has been clearly the origin of the human mind with all its noble powers. It by no means follows from this fact that there have not appeared in many human minds faculties which greatly transcend anything which we observe in the highest of the Mammalia below him. In the first place, it is probable that ideation in the latter never extends beyond induction, and, in a more limited degree, deduction ; and that neither of these faculties are ever applied to their subjective states, although they evidently are applied to those of other animals and of men. And it is necessary for evolutionists to believe that the origin of the human mind being what it is, it is quite impossible that any ideas should exist in it which are not of experiential or empirical origin, no matter how much they may transcend those of the lower animals. Thus to the lessons of experience are traced the highest generalizations, as the "categories of reason" of Aristotle, and of Kant, and the fundamental axioms of mathematics and of logic. This follows necessarily from the fundamental realism of evolution, which posits the existence of tridimensional resistant matter which exhibits the two qualities of motion (energy), and in some of its forms, consciousness (mind), neither of which can transcend the limits inherent in the nature of dimensions and resistance. Thus we reach the inevitable conclusion, as pointed out by Spencer, that even the highest human faculties have been attained by experience, by slow acquisition and inheritance. And this apparent spontaneous appearance of the high powers of generalization in the mind is under this hypothesis due to the perfecting of the machine during the phylogeny of the race, by inheritance by the individual, and not to any *a priori* or intuitive powers which it possesses.

It is a curious fact that many thinkers on these subjects hold the evolutionary doctrine above described along with the idealistic philosophy. In other words they maintain, at the same time, two doctrines which are, in their extreme forms, contradictory, and mutually exclusive. If the origin of the human intelligence by evolution be true, then the theory of idealism, which is the prevalent philosophy of the century, is false ; and *vice versa*. And yet the same men cling to both, and are unable, naturally, to

harmonize them. And there is indeed truth, as usual, on both sides of the question, which will form, when harmonized, a consistent whole, and a true philosophy.

The truth of realistic doctrine is demonstrated not only by the fact of evolution, but by the general result of scientific research. The indestructibility of matter and the conservation of energy have been demonstrated in a vast number of instances. If our knowledge of the varied properties of matter is defective, the defect is growing rapidly less, and no limit can be put upon our progress in this direction. But apart from this, it is safe to infer what we do not know of the properties of matter from what we know, very much as we can infer the general characters of the lost parts of the anatomy of a vertebrate animal from its skeleton alone. Moreover, the mind is as capable of perceiving disorder as order. It appreciates the disorder of a wrecked building as readily as the order of increments of wave-lengths, of chemical equivalents, or of cusps on the tooth of a mammal; and although the knowledge of order and of disorder is organized in the subjective, the order we observe in nature is not in us, but it is in nature; it is objective, and not subjective. It is the cause of our perceptions, and our perceptions are not the cause of it.

What are the truths of idealism? Kant, while admitting the validity of sense perceptions, in opposition to pure idealism, asserted that they are only comprehensible to us through a subjective and a *priori* form of thought, and that we understand objects in accordance with that form, and not as they are in themselves. And first of all the forms of thought, those of space and time, constitute the basis of our interpretations of Nature as we see it. It is this qualified idealism of Kant which the evolutionist needs chiefly to consider.

The question has been often debated, Are these fundamental forms of thought *a posteriori* or *a priori*; are they known by experience or are they deeper than experience? If evolution be true they are only known to man, as Bain asserts, by experience. But the question again arises, Is the human mind all there is of mind in the universe? To say the least of it, such a view is open to serious question; and by most rational persons a negative reply, based on probabilities, would be promptly given. To my own understanding the restriction of mind to this speck called the Earth is highly improbable, and any assertion to that effect appears to be without sufficient basis. There being doubt then as to this point, we are compelled to examine again the qualities of mind itself to see whether there is any ground for a belief in its possession of *a priori* qualities. In this quest from an evolutionary standpoint we can have but one criterion. We cannot assume that any of them can be developed in men without experience, but we can ascertain whether any of them *are in themselves equally true in the absence of experience of an objective universe, as with such experience*. Such faculties, if possible, could be predicated in varying degrees of minds dwelling in environments differing from those of this planet, and of minds which might have existed before evolutions should have

reached their final stages here or elsewhere. In other words, such faculties would characterize mind in general as distinguished from, yet including, the human mind. But I must here insist that such mind cannot be conceived to exist apart from a dimensional (material) basis of some kind.

This classification of thought is different from the division into the contingent and the absolute, since both of these types are to be found in the experiential and in the *a priori* fields. The axiomatic properties of matter, dimensions and resistance, are not contingent, but absolute; while the movements of matter are contingent on each other and the sources (in the mental field) from which they may be derived. So also in the *a priori* field. While the axioms of logic are not contingent, many of the activities of mind are contingent on each other (and also on those of other persons) and on material conditions.

It is obvious that there are truths which are equally valid with and without the material of experience. It is also true, as shown by Aristotle, that there is a scale of generalizations, which is at the one extremity purely experiential, and at the other purely formal; and that the intermediate members of the series are on the one side experiential and on the other formal. The categories display this double validity. On the one side they express the relations of objects, and on the other, those of thoughts. Even the simple method of induction is applicable to mental noumena as it is to material phenomena. But the highest generalizations clearly have a validity independent of experience, although our race may not have discovered them without it. These are, *first*, generalizations which are exclusively formal. These are the two fundamental axioms of logic; viz., the maxim of contradiction and the maxim of excluded middle. *Second*, generalizations which, while valid as forms of pure thought, are also deducible from experience. These are Time, and the categories Modality, Relation, Quality and Quantity (Kant), etc.

The fundamental and only form allowed by Rosmini, is the "intuition of being." In its subjective human application this is the basis of the "Cogito" of Des Cartes, and the Ego of Fichte. In the same sense it is the "self-consciousness" of the evolutionary psychology. In its broader aspect it may include consciousness of all grades, and as such is a postulate of the mentality of animals as well as of men. Kant includes space with time in the forms of thought. This cannot, it seems to me, be admitted. Space is not in any sense a form of thought, but is derived from experience of matter, of which it is one of the two definitions. It is certainly not a condition of thought, as time evidently may be, *i. e.*, as succession of thoughts. This one characteristic of Kant's system made it idealistic rather than realistic.

In the following table I arrange the contents of cognition in accordance with the principles above indicated.

The relation of these several functions of mind to its objective or material basis is both destructive and constructive. Physiological science and common experience show that they cannot be performed without the usual decomposition of matter and dissipation of energy. But evolution shows that they have also done something else of a diametrically opposite character. In the course of ages they have built up on the Earth, by successive increments, a mechanism whose function has been that of continuously developing mind. And this continuous development of mind means successive increase of control over the environment; in short, the development of a control by mind of matter. How this can have been accomplished may be considered in the following pages which treat of the will.

II. THE WILL.

The will has two aspects from which it may be viewed, the physical and the metaphysical. As the link between thought and action it represents the contact of the one with the other. If all thought be mechanical, then will does not differ from other links in the chain of causation. If, on the other hand, the universe be a psychic product, will is again but a passing phase of the stream of thought. But if mind be an attribute of matter, whose existence depends on its own success in resisting a tendency to extinction, then will is something definite, which presents the two aspects already referred to. The will, as the executive power of the mind, is either free, or it is determined by antecedent mental conditions; or as a function of matter, it is free, or it is determined by present physical conditions. Which of these propositions is true is the second question of the ages.

On the metaphysical side the will is determined by preëxistent motives, or appears to be. The situation is such that the negative of this statement cannot be clearly proven. A will which acts without motives is incomprehensible. Motiveless acts cannot be regarded as mental. It has been suggested that there is an opportunity for metaphysical freedom of will in situations and under circumstances which are prior to experience. But even in cases where there is a defect of experience, an almost inconceivable condition, the imagination will furnish motives. It is impossible to escape metaphysical determinism.

The physical action of the will is less simple. In the performance by an animal of a reflex act, we believe that the act is the direct result of a stimulus which passes into a mechanism so constructed as to release energy in the direction of, and to the end to perform, the act in question. Into such a process there enters no distinct element called will. In an animal possessed of intelligence, to ever so limited an amount, the direction of an act not reflex, is due to the presence of consciousness in the performance. This consciousness is generally supposed to exercise a directive influence until the movement has been thoroughly learned, or has become automatic, a term which is applied to acts more nearly allied to the voluntary

than are the reflex acts. The effect of the interference of consciousness is to give the act the character of design, or a direction designed to satisfy some consciously felt want. Such design is also displayed by reflex and automatic acts, but it is impossible to suppose that these have originated in any other way than as results of voluntary (consciously directed) acts by the ordinary and well-known process of automatization (cryptophny). Any other theory of their origin is incredible.

The process of performance of the voluntary act involves then an antecedent metaphysical element which constitutes its motive. Motives, as already mentioned, are derived from the emotions and from the intelligence. They may be classified as follows :

Emotional ;	{	Appetites,
		Tastes,
		Affections,
		Passions.
Intelligent ;	{	Imaginative,
		Æsthetic,
		Rational.

In various proportions and degrees some or all of these faculties inter-act as motives in all animals from the *Amœba* to man.

It has been denied that the metaphysical element enters into the performance of an act. The reason for this opinion is clear. An act by an animal is a contraction of protoplasm, either undifferentiated or as muscular fibrilla. To produce this movement a communication of motion is necessary. The metaphysical motive cannot, however, be weighed. The existence of the motive represents an expenditure of energy in the arrangement of the molecules (of the brain cells in an animal with a brain) which shall express such a form of consciousness, but there can be no correlation of energy between the significance of the motive and such expenditure of energy. Since an idea (motive) has no ponderosity, it cannot communicate motion to a nerve or muscle cell. Hence a metaphysical state cannot direct an act. For similar reasons the converse of this proposition is true. Material conditions can have no effect on mind, for that which has weight cannot impress or modify that which has no weight. Matter cannot control mind.

The only answer to this position is that it is contrary to the facts as observed. To deny that a state of consciousness can influence a current of energy, is to assert that animals do not eat because they are hungry, nor drink because they are thirsty. It is to assert that unconscious acts possess the same design in new and unexpected cases, as conscious ones, a statement which we know to be false. It is to assert that the muscles of the human tongue are not controlled by motives when engaged in the use of language. It is in fact to contradict the daily observation of mankind in thousands of instances. It is easier to believe that metaphysical

states in the form of motives control the direction of energy in spite of all the difficulties involved in the belief.

There is, however, evidence that such is the case apart from direct observation. On no other hypothesis is it possible to account for the evolution of the mechanism of the brain, the organ of mental phenomena, and of the remainder of the organism which is so well adapted to minister to its necessities. The evidence furnished by evolution is to the effect that continuous use (and disuse) of parts of the body for definite reasons (mostly appetites) have modified their form, and that such modifications have been inherited and added to by succeeding generations, until a high degree of specific adaptation, or specialization, has been reached. And this specialization is profitable to its possessor, enabling it to resist the antagonistic energies of nature, and thus to escape the early "integration of its matter and dissipation of its energy." In no other way can the development of man be accounted for, in whom the upward and progressive opposition to the downward and retrograde law of dead matter has reached its highest expression. The designed acts of animals have ever protected and multiplied them, and given them, in ever-extending degrees, control of their environment. This cannot be accounted for on any hypothesis excepting that here maintained, viz., that the metaphysical condition enters into the designed act and determines its nature or direction. The attempt to account for this evolution on the basis of natural selection exclusively, is a paralogism, since a selection does not account for the origin of anything, and evolution is the history of the origin of things.

We may now return to the consideration of the characteristics of an act of will. The first stage in the performance of an act is the formation of a judgment. This is simply the complete balance of the motives. It is a metaphysical process, a weighing of considerations derived from purely mental sources, in which the result is reached, not by comparing actual weights, but by comparing sensations and generalizations. In execution, the direction of the act is strictly derived from the judgment in the first place, and is only secondarily derived from the object of the act. Thus an animal projects one ear or the other under the influence of a single motive, curiosity. An animal climbs a tree or hides in a hole under the influence of the same motive, viz., fear. A man worships a fetish, a Brama, or a Buddha, under the single influence of religious feeling. He gives to any beggar that applies to him, under the direction of the one motive, benevolence. It is evident in all of these cases, which are but illustrations of the universal fact, that the expenditure of energy in the act of willing has no measurable relation to the result attained. Thus an animal or a man may expend more or less energy in performing any of the acts cited, according to material circumstances; as for example, the length or shortness of the ear; the height or distance of the tree; the earnestness of the worshiper, the manner of his worship, etc. Still less is there any correlation between the expenditure of energy in the brain

of the actor, and the effect of his acts on society, the world, etc., and for the same reasons. His acts enter other minds as motives, and the same process is repeated, indefinitely.

To repeat the proposition in a summary form. The character of an act of will is derived from two factors. *First*, subjective, the motives already existent in the mind; *second*, objective, the object or end towards the accomplishment of which the act is directed. In neither the first nor the second process is the law of the conservation of energy observed *on the metaphysical side*, though it doubtless is on the physical side. That is, in the formation of motives there is no correlation between the reasons adopted as sufficient, and the energy expended in weighing them. Secondly, there is no correlation between the direction taken by the act, and the energy expended in performing it. The reason for this second proposition is identical with that which explains the first. The direction or object of the act is also due to motives which only differ from those embraced in the first proposition in their later origin in time.*

The relation of these facts to the physiology of an act of will is as follows. The stimulus to act enters the brain by the sensory channels and comes, probably in the cortical cells of the anterior lobes of the hemispheres, into the structural mechanism of the intelligence. Here a mechanism exists, formed under the direction of all the mental faculties of ideation, from which a judgment issues. Or if the case be a new one, a rearrangement of molecules takes place as the combined result of the old and the new ideas, and a new judgment is formed. Here we have repeated the primitive process of creation of ideational centres. Next, the judgment furnishes the form for the outgoing act, which then repeats, on the objective world, including the person of the actor, the rearrangement of matter under its direction. Thus are modified at once, under the same judgment, the animal and its environment.

The extent to which a judgment is creative, evidently depends on its purity as judgment; only the "colorless judgment" is absolutely creative. As has been already pointed out (page 495), when discussing memory, the reproduction of mental function becomes more complete as we approach the rational faculty, and *vice versa*; it grows less as we pass successively to the imagination, the emotions, and least of all as a sequence of sensations. The coincidence of this fact, with the utility of intelligence, is not accidental. And we may then conclude that the highest creative power resides in exercise of *a priori* or formal thought, on the ground of physiological economy. We may conclude that, although the will is always strictly determined from the metaphysical side, it is free from necessity on the physical side, save only that imposed by the dimensions and resistance of matter. And in the coincidence of formal thought, which is universal thought, with conditioned freedom of will towards matter, we have the essentials of creative power, and a creative personality.

* American Naturalist, June, 1888, On the Relation of Will to the Conservation of Energy.

III. CRITICAL.

The system outlined in the preceding pages falls within the field already cultivated by Schopenhauer and especially by Hartmann. This is distinguished from those occupied by the older metaphysicians in the important function assigned to will. The older schools, both idealistic and realistic, occupied themselves chiefly with the discussion of the principles of cognition. The philosophy of evolution requires something more than this. If there be anything beyond the world and human life on it, it can be only discovered by an investigation of the nexus between mind and matter. And if there be any nexus at all, in which the mind is not entirely subordinate, it is will. If there be any directive principle at the bottom of evolution it is to be found by research in this direction.

What this will is in its essence I have attempted to show in the preceding pages. It is regarded as the *realization* of thought, as is done by Hartmann; or as the expression of energy, the degree and nature of whose rationality depends on mental conditions. But the system differs totally from the two philosophies in question in being a philosophy of the conscious and not a "philosophy of the unconscious." Automatic and unconscious will are derived from the conscious by cryptopnoy, and not the reverse. The result is thus theistic and not atheistic, and optimistic and not pessimistic. It is the Darwino-Hartmannian system inverted. For although Hartmann's system promises progress through pain, as must any system of evolution, it does not furnish any rational basis for progressive evolution, but is essentially retrogressive, pessimistic, and nihilistic. It is Darwinian and not Lamarckian.

As regards the fundamental doctrine of Spencer, the relativity of knowledge, the present method brings us to the result, that the scope of such relativity diminishes directly as the generalization in constitution of the physical basis of mind. For this method postulates the existence of mind as prior and not subsequent to organization, a fact demonstrated by organic evolution. And although so long as there is a physical basis there is no "absolute" in action, the will is sufficient for creative functions, both subjective and objective.